EBMX TROUBLESHOOTING TIPS

Common troubleshooting guide for stock and modified SurRon bikes

Classification: EBMX Dealer and Customer reference document

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Procedure Document Authorisation

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1 Document Objective

Please note that EBMX strongly advise that power kits are installed by professionals at approved EBMX dealer. If you choose to install a power kit by yourself, you are fully acknowledging the risks you take (to yourself and the power kit/bike). Failing to install a power kit correctly or preforming modifications to your bike yourself could result in damage to your power kit/bike or to yourself. EBMX and our dealer network take no responsibility for issues arising from self-installation of power kits.

If issues arise with the self-installation of your power kit, you will be required to fully read this document and contact the EBMX dealer where you purchased your kit with the requested information provided on the inspection sheet at the end of this document. If the issues with the controller are determined to be user error or abuse, you will be charged a tuning fee of $150 USD

This document has been created to assist with EBMX Dealers and customers with troubleshooting common error codes and issues with SurRon/Segway electric dirt bikes.

This document provides key information and checks that should be read, understood and actioned by anyone planning to undertake a self-install on a controller power upgrade kit. Failure to read this document and comply with the checks, suggestions and advice listed within could result in damage occurring to your bike/controller kit that will not be covered by the manufactures warranty. Please also note, this document should be used in conjunction with the EBMX controller kit install video on YouTube.

The key areas covered in this document are:

- Troubleshooting stock SurRon bikes not functioning correctly
- Troubleshooting EBMX APT Display
- Troubleshooting EBMX ASI BAC Controllers

Use the table of contents as a guild to quickly find the section of this document relevant the issues you are experiencing

If your issues are not resolved, please contact the EBMX dealer that you purchased from for further assistance.

2 Troubleshooting Stock SurRon/Segway Bikes

2.1 Checks for new Stock SurRon / Segway

Upon receiving your new SurRon there are a few checks to make. If you purchased from an EBMX dealer or store then these should be done before you get the bike, but if you were drop shipped a bike and have built it yourself, please ensure the following checks have been done before continuing

- Ensure the circuit breaker (located behind where the battery sits, towards the USB port) is turned off (switched to the left)
- Check power cable and communications cable are correctly plugged into the battery
- Once plugs are in their correct locations, turn the circuit breaker on (switched to the right all the way)
    - Ensure you always disconnect the circuit breaker prior to removing the battery and when replacing the battery and joining the power lead onto the battery.
- (SurRon Youth) If you want to remove the speed limiter on the bike you will need to clip the small green cable that is looped out of the harness near the connection to the battery, see picture →

- (Segway X160 / X260) Ensure you download the Segway app, register your bike and then adjust the speed and power limits as desired. The stock configuration of the controller will limit power and top end speed and can only be changed via the app. See picture of the app icon →

- Ensure you are not holding a brake lever when trying to accelerate. There are brake sensors on the bike that will cut power to the bike as soon as the brakes are touched.

2.2 EBMX "Best Practice" riding and bike care tips

2.2.1 Increased Power means increased heat!

Once you have added a new motor controller and done a battery bypass or added an EBMX aftermarket battery, you will be riding a bike that is significantly more powerful than that stock bike!

- The stock SurRon/Segway runs at 5.6kW and around 200 Phase Amps.
- An EBMX tuned bike with stock battery (bypassed) is running 8.5kW and 400 Phase Amps.

- An EBMX BAC 4000 tuned bike running an aftermarket EBMX battery (60v or 72v) is running 12kW and 425 Phase Amps.
- An EBMX BAC 8000 tuned bike running an aftermarket EBMX battery (60v or 72v) is running 15kW and 600 Phase Amps!

With all of the increased power comes the potential for increased heat in the motor. You will be hard pressed to ever overhead a stock bike but it is very possible to overheat a motor when you are using double or even triple the kW and Phase Amps. With this in mind, to ensure long run times and limiting overheating issues, you need to be mindful of how you ride. Here are a few tips for keeping your motor temperature in check while running high powered tunes:

1. Find the ride mode that is right for the riding you are doing. Don't use power mode 5 (when set to 5 modes) unless you really need that extra power! See if you can ride smoother and achieve the same speeds using a lower power mode.
2. If you are really going for speed runs on a track or trails where you are using a lot of wide open throttle (WOT), ensure you take regular breaks (every 8-10 minutes) to let the motor cool down and wait up for your mates before continuing on with your ride.
3. Do your best to ensure you do not get built up dirt/mud around the motor and in between the bash guard and motor. The SurRon motor is air cooled so if airflow over the motor is blocked and the cooling fins are filled with mud, the motor will head up much faster and will take much longer to cool down.

2.2.2 Jumping with a high powered SurRon

Let's be honest, we all love hitting jumps on our SurRon bikes… however after you have installed an aftermarket controller, there are a few more considerations to take in mind when jumping your bike. Please read the following suggestions closely and adhered to the advice to ensure you don't experience unexpected power loss or error codes while jumping your SurRon. Riding and jumping electric moto's should note be performed in the same manner as jumping petrol bikes.

1. Ensure you DO NOT use throttle in the air on your e moto where possible. Revving the motor in the air can cause multiple errors and faults. Because there is no resistance on the rear wheel, the electric motor can spin up extremely quickly. Then hitting the landing the wheel is quickly brought back to speed which you are traveling. While the wheel is being slowed down (very quickly) it puts a large spike of current back up into the motor controller. If this spike is large enough, the controller will work to protect its self and shut the bike down and may display error codes as well and require a restart to get going again.
2. Using throttle in the air and then landing is also the quickest way to snap a belt. Even a 40kg 10 year old kid can snap a brand new belt riding a stock bike if you get the right combination of motor revs in the air and having good traction on your landing.

2.2.3 Washing your SurRon

Once you have modified your SurRon with an aftermarket controller, it is even more important to be careful when washing your bike. Please follow the washing tips below to ensure you do not cause any electrical issues. If washed improperly, there are many faults that can be caused by getting water in places it does not belong. These issues can range from the bike acting completely dead, errors on the display and inconsistence throttle response.

1. Before washing your bike, you should always flip the circuit breaker off and remove the battery.
2. Ensure you always use a low pressure hose on “spray mode” and never use “jet mode”.
3. Wet your bike quickly with the hose and then work with a wet soapy rag to clean the bike.
4. Quickly rinse off the bike with the hose. Ensure never to directly spray water on the sides of the controller and be mindful to stay away from spraying any electrical connections.
5. Re-install your battery and test your bike to ensure it is functioning correctly. If you are experiencing any odd behavior or errors then you will need to start disconnecting plugs to check for water ingress.

If you are often riding in wet weather or having issues with faults occurring after washing your bike, you might want to purchase some dielectric grease and add this to all of the electrical connections to help mechanically keep water out of the connections.

2.3 Troubleshooting APT Error Codes

The following section will run through the most common error codes you might encounter on your APT display. Please ensure you read through and try all of the solutions before calling your EBMX dealer to assist with troubleshooting.

If you are unable to resolve the issues you are encountering and require assistance you will need to book in a time to receive support and pay for receiving assistance. If the issue turns out to be a manufacture or supplier issue, you will receive a full refund of any support payments you have made.

The error codes you will encounter while using an ATP display are as follows:

Error Code	Error description	Handle
30	Communication Error	Check the cable connection
21	Current protection	Check controller.
22	Throttle error	Check throttle and connection.
23	three-phase power error	Check three-phase power line connection
24	Hall error	Check the hall connection
25	Brake error	Check the brake connection.

2.3.1 Troubleshooting ERROR – 30H

This error is classed as a communications error and is the most common error seen when running ASI aftermarket controllers. As there are multiple different things that affect the communications of the bike this error can point to a very broad range of issues. Please try checking the following things:

1. Unplug every electrical connector that was used while installing the new harness and inspect the male ends. Check to ensure all pins are straight and undamaged. If you encounter any pins that are bent over, carefully straighten them with a small screwdriver or pick. Ensure you have the ring terminal coming out of the harness attached to the ground (black -) terminal on the controller.
2. Try unplugging the kickstand sensor cable in the rubber boot behind the motor bash plate. This cable can become damaged from off road riding and if damaged cause errors on the bike making it can think the kickstand is down when you are trying to ride. It can also trip out error 30H if multiple strands of the wires are damaged and able to short circuit with each other. Ensure you cover off the exposed end of the plug once you have disconnected the sensor plug.
3. Have you had any recent crashes on the right side of the bike? The electric throttles on the stock bikes are great until you crash on them.
4. Have you washed your bike recently or ridden through water? If so, you have likely gotten water into your connections. Remove the motor controller and unplug the connections and inspect for water. Clean your connection out and let them dry before re-attaching and testing again
5. Take out the BAC controller and inspect the stock side of the bike harness that plugs into the top two connections on the BAC harness. If you are not careful when installing the BAC controller it is possible you might have pinched the wires in the harness between the top BAC mounting bracket and the frame bracket where it mounts to, look for any damaged or squished wires.

2.3.2 Troubleshooting ERROR – 21H

Error 21H is an over current error. This error is most commonly shown when getting cut outs from jumping the bike and revving the motor in the air. As described in section 2.2.2, do not rev the motor in the air.

This error can also happen if your hall sensor is out of alignment and your motor needs to be calibrated.

2.3.3 Troubleshooting ERROR – 22H

Error 22H is a throttle error. This error is most commonly shown when the throttle cable is damaged. Inspect the throttle cable all the way down to where it is connected into the plug in the boot by the motor. If you cannot see any visible issues, try replacing the throttle.

It is very important to note that the stock tune is set up for a stock SurRon throttle. The stock throttle runs a voltage range of approximately 0.9volts – 4.1volts. If you are using an aftermarket throttle (such as Domino

or Magura or other) they might have a different voltage range and this could be causing issues. For example, the Domino pot throttles have voltage range of 0v – 5v, very different from the stock throttle.

Ensure you are only using a stock throttle unless you have worked with a EBMX dealer to re tune your controller for a specific aftermarket throttle.

2.3.4 Troubleshooting ERROR – 24H

Error 24H is a hall sensor error. This error is most commonly shown when your hall sensor is out of alignment. There are several scenarios we have found where this error comes up. The most common are as follows:

1. After running a high powered tune the hall sensor shifts out of alignment and causes an error. There are a lot of resources online showing you have to check your hall sensor and to realign it. Please research this and inspect the hall sensor in the motor.
2. This error can also be caused by loose or incorrect electrical connections. Unplug every electrical connector that was used while installing the new harness and inspect the male ends. Check to ensure all pins are straight and undamaged. If you encounter any pins that are bent over, carefully straighten them with a small screwdriver or pick.

2.4 Overheating motor and losing power

Does your bike seem to lose power after riding for a while? Upon inspection does your motor feel very hot if you touch it? Please re-read section 2.2.1.

If you feel the riding you are doing is not abusing the extra power you now have in the bike, it is possible that the motor temperature sensor in your bike could be faulty. It is important to check the temp sensor resistance value when the motor is cold so make sure you take the reading well after any rides you have been doing and you are sure there is no build up heat in the motor.

To check the motor temperature you need to remove the motor bash plate and then open up the rubber boot housing the bundle of electrical connections. Find the plug that has a wire running to the motor and unplug the connection.

Using a multi meter set on Ohms (Ω) take a reading while touching the pin from the black and white wires. Record this value on the Bike Info and Inspection Form at the end of this document.

2.5 Sudden loss of power under full throttle

This issue is most often seen while using a stock battery that has been bypassed. Once a battery bypass has been completed and an aftermarket controller has been installed on a bike with a new tune, the battery cells

are put under much high loads then what the stock settings could allow. Under heavy load applications (full throttle – epically in high power modes) the stock Panasonic battery cells experience significant voltage sag and are able to drop down to the low level cut off values set by the tune to protect the battery. If you reach the first low level cut off you will lose throttle response and have to grab the throttle again and you can keep riding but if you keep pushing the bike you will experience another tip shortly after again.

If you keep pushing the bike and drain the battery further and keep riding hard you may reach the second low level cut off where you will have to restart the bike (off/on with the key) to get it going again.

If you look at the resting voltage of your battery it might not even look that bad, it can be around 60v still but if you watch the voltage value drop under a heavy acceleration run you will see that 60v quickly drop below 50v and then the bike will trip shortly after.

It is also possible to have this issue with other batteries when they start to get low in their voltage range and depending on the type and quality of cells used, you will encounter more voltage lag and get this type of issue earlier on in your rides.

There are two solutions to this issue.

1. Stop drinking, going out and eating and shopping online…. Save some money and buy a proper EBMX 60v or 72v battery and never look back at issues like this again.
2. Understand what is written above and ride the bike to level it allows without tripping. Often switching down to lower power modes and ensuring you are not WOT for longer than 1-2 seconds will allow you to keep riding for a while longer.

3 Bike Info and Inspection Form

If you have read through this full document and tried all proposed solution to issues discussed and are still having issues, then it is time to contact your local dealer and request further help.

Please complete this form to provide all relevant information for EBMX to assist with troubleshooting.

1. What EBMX dealer did you purchase your kit from? Please provide invoice number / proof of purchase info and confirmation that you registered your warranty online after purchase.

2. Who installed the power kit on your bike?

3. Please give a full description of your bike build

Controller info:
Battery info:
Throttle info:
Other upgrades on the bike:

Please give a full description of the issues you are having. Please include info about what type of riding you are doing, what power modes your ride in, ride times before issues… The more info you can provide the better. If you believe your bike is overheating prematurely, please include the resistance value (ohms) across the motor temp sensor (read section 2.4)

By submitting this form you are requesting aftermarket support from EBMX. Upon review of your form it is likely that you will need to pay for a remote tuning session ($125 USD) to troubleshoot your bike, before the remote session can be booked in. You will need to have an Android device (apple will not allow remote control on their devices) and you will need to download two apps: “Team Viewer Quick Support” and “Bacdoor 2.0”. If following the remote support session the problem is determined to be a defect from the manufacture or dealer of the power kit components you will be refunded the charge for the remote assistance session.

Please acknowledge that you understand the terms of the support that is being offered and confirm that all information you have provided is correct to the best of your knowledge.

_____	_____	_____
Name	Date	Signature